2.0 PROJECT DESCRIPTION

This Section describes the general project setting, project background, and details regarding the proposed Project. Section 2.1, Project Setting, summarizes the regional and local setting of the Project. Section 2.2, Project Background, presents an overview of the existing Marine Terminal history and lease information. Section 2.3, Description of Current Operations, discusses operations at both onshore and offshore facilities. Section 2.4, Oil Spill Response Capability, addresses the personnel, facilities, and equipment prepared to respond to a spill. Finally, Section 2.5, Proposed Project and Potential Future Operations, describes the potential future operations of the Marine Terminal, including potential increases in vessel calls and Marine Terminal maintenance activities.

2.1 PROJECT SETTING

The Project site is surrounded by:

- residential, commercial, and industrial uses in the city of El Segundo, California;
- public beaches including Dockweiler and Venice Beaches to the north and Manhattan and Hermosa Beaches to the south; and
- small craft harbors Marina del Rey, four miles (6.4 kilometers [km]) to the north, and King Harbor, five miles (eight km) to the south.

For regional and area views, please refer to Figures 2-1 and 2-2.

The Project facilities off the coast of El Segundo are approximately 19 miles (30.6 km) east-southeast of Point Dume and 11 miles (17.7 km) north-northwest of Point Vicente in Santa Monica Bay in Los Angeles County. The offshore area leased from the California State Lands Commission (CSLC) includes state tide and submerged land in Santa Monica Bay located within Township 3 South, Range 15 West, San Bernardino reference Meridian. The upland owner is Chevron Products Company (Chevron) , and the upland address is 324 West El Segundo Boulevard, El Segundo, California, 90245.

The land surrounding the Chevron-owned onshore facilities associated with the Marine Terminal consists primarily of industrial property, including Chevron's El Segundo Refinery to the east; Southern California Edison's power plant to the south; and the city of Los Angeles's Scattergood Plant, the Hyperion Wastewater Treatment Plant, and Los Angeles International Airport (LAX) to the north. El Segundo Beach is located west of the onshore facilities, between the facilities and the offshore terminal.

Figure 2-1
Regional Map

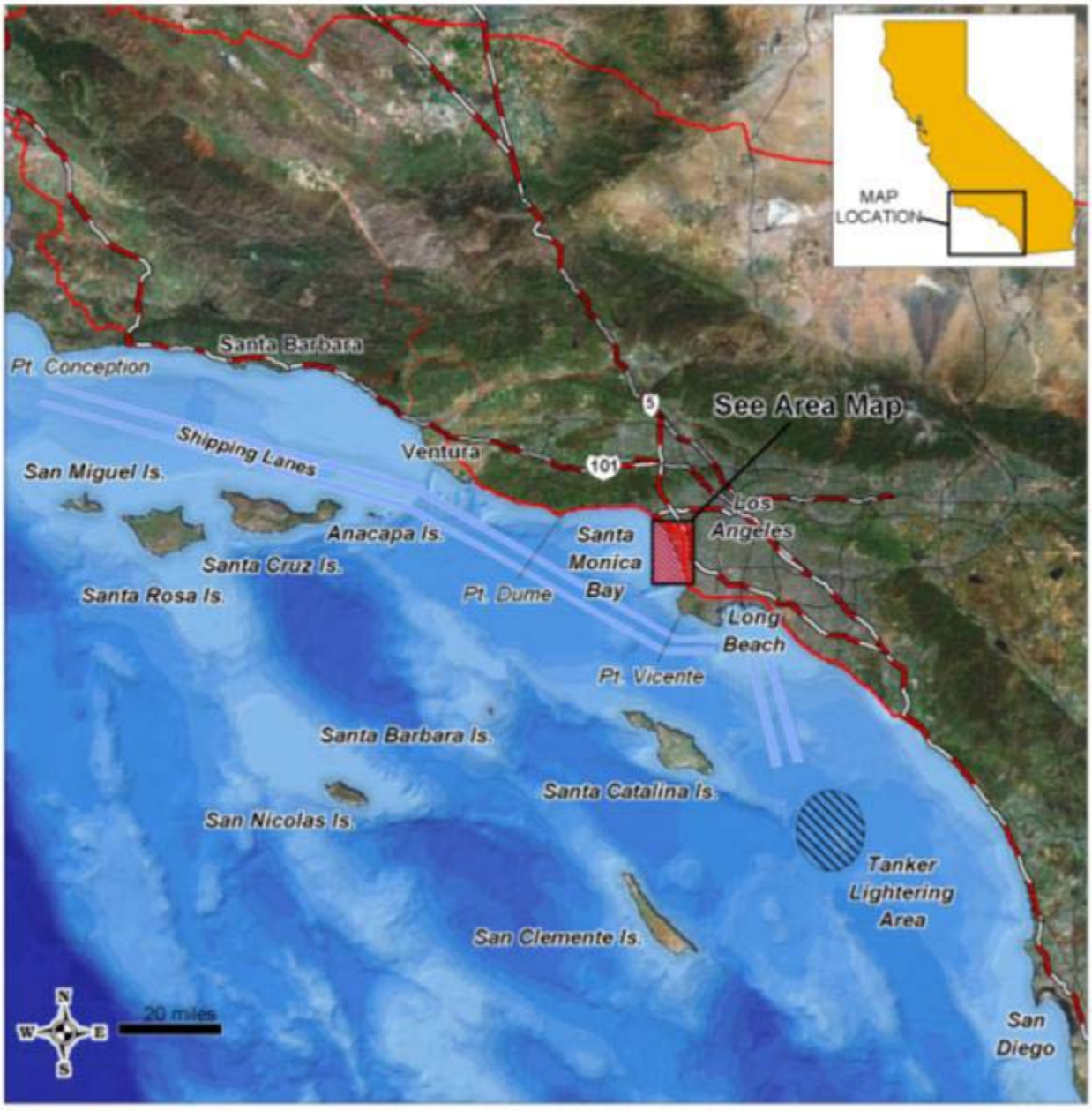


Figure 2-2
Area Map

Source: Berths, Pilot Boarding Area, and Federal Anchorage locations based on NOAA Chart No. 18744

2.2 PROJECT BACKGROUND

The El Segundo Terminal is part of the larger Chevron El Segundo Refinery, in El Segundo along the Santa Monica Bay. The Refinery processes up to 270,000 barrels per day (bpd) of crude oil and produces refined products, including gasoline, diesel, and jet fuels. Approximately 80 percent of the Refinery crude oil is received through the Marine Terminal, with the remaining crude oil primarily received through pipelines from onshore fields. Refined products are primarily sent out by pipeline (85 percent) and truck and rail. A small percentage (approximately four percent) are sent out through the Marine Terminal.

2.2.1 El Segundo Terminal History

The Marine Terminal and Refinery have transferred and processed crude oil and petroleum products at the current location since 1911. Chevron leases approximately 221 acres (89.4 hectares) of public land from the CSLC as a barge and tanker transfer facility for crude oil and petroleum products (see Figure 2-3). Although the facility is capable of operating 24 hours a day year-round, actual operations depend on shipping demand. The Refinery sits on approximately 1,000 acres (404.7 hectares) of Chevron-owned upland property immediately east of the Chevron-owned onshore Marine Terminal site.

In 1978, the CSLC and Chevron consolidated three existing leases of four multiple-buoys, offshore Marine Terminal berths into a single lease, PRC 5574. These offshore berths serve the Refinery for delivery of crude oil and transfer of refined products by tank ship. Lease PRC 5574 was issued for a period of 15 years with three successive periods (extensions) of 10 years each. Chevron has exercised two of the 10-year extensions but neither has been authorized by the CSLC, who considers this lease to be in holdover. The physical configuration of the berths has been modified since commencing the lease in 1978. The berth closest to shore, Berth 1, was removed in 1985, and its pipelines were abandoned. Berth 2 was removed in 1992, and its pipelines were extended to Berth 3, making Berth 3 a multiple-use berth. The removal of Berth 2 resulted from and addressed concerns by Chevron, the CSLC, and regulatory agencies following a March 16, 1991, spill at the Marine Terminal. The tanker Omi Dynachem snagged and broke a mooring pipeline with its starboard anchor, causing a reported spill of 220 barrels (9,240 gallons) (see Section 4.1, System Safety and Reliability).

The current lease covers multiple-buoy Berths 3 and 4 and several active and abandoned pipelines. Chevron has applied for a new 30-year lease covering the existing berth facilities.

Figure 2-3
El Segundo Marine Terminal and Refinery Detail

Information from previous relevant documents has been appropriately used in preparing this Environmental Impact Report (EIR), including the Draft and Final Environmental Impact Report for the Exercise of Option to Renew a Lease of State Lands for the Chevron Marine Terminal at El Segundo, Los Angeles County, prepared by the CSLC (CSLC 1996). In particular, information pertinent to oil spill modeling has been reviewed for applicability to the proposed Project and used where appropriate in this EIR.

2.2.2 CSLC Lease Boundary and Regulatory Boundary Areas

The CSLC lease and regulatory boundary areas include offshore and onshore Marine Terminal facilities. The Marine Terminal is located adjacent to Chevron's petroleum Refinery. The Marine Terminal area is an approximately 221-acre (89.4-hectare) footprint of public land leased from the CSLC as a barge and tanker facility for crude oil and petroleum products. The lease boundaries include the following areas:

- The onshore portion located immediately west of the Refinery and Vista Del Mar Road along the beach, which includes the pump stations, control house, two substations, and a helicopter landing pad;
- Circular areas encompassing offshore Berths 3 (1,000-foot [304.8 meters {m}] radius) and 4 (1,210-foot [368 m] radius);
- Active pipeline corridors ranging from 50 to 60 feet (15.2 to 18.3 m) wide, running the length of the active pipelines from the onshore lease area to the berths;
- An abandoned pipeline corridor, 60 feet (18.3 m) wide, from the onshore Marine Terminal area to the abandoned Berth 1 area; and
- An area, approximately 900 by 160 feet (274.3 by 48.8 m), encompassing the rock groin.

2.3 DESCRIPTION OF CURRENT OPERATIONS

The Chevron-owned onshore Marine Terminal facilities are an integral part of the Marine Terminal operations. Current operations include functions at the offshore facilities and at the onshore pumping area and tank storage at the Refinery. The following sections discuss each of these.

2.3.1 Offshore Facilities Current Operations

The Marine Terminal's offshore facilities include active Berths 3 and 4, which consist of moorings and pipelines that connect the active berths to the onshore Marine Terminal pumping and storage areas. The proposed lease also includes pipelines abandoned on the seafloor, a protective rock groin, and sand beach fill at the southern boundary of the Marine Terminal shoreline. Each of these offshore facilities is shown in Figure 2-4 and is then described in further detail.

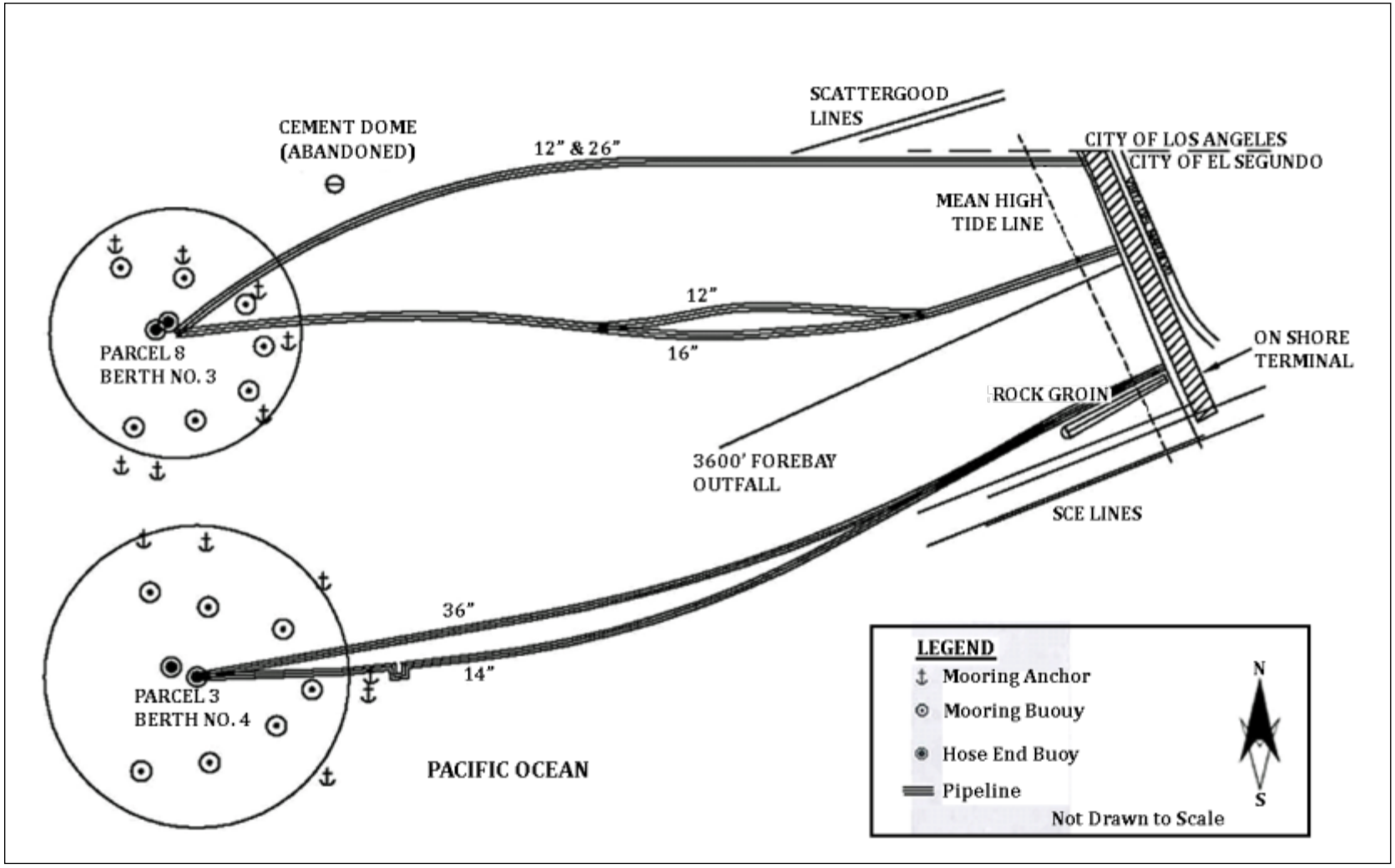
Berths 3 and 4, conventional buoy moorings (CBM), are located in water ranging from 63 to 76 feet (19.2 to 23.2 m) deep. A CBM system uses a number of buoys located in a circle around a vessel to hold it in a fixed position, while hydrocarbons are pumped to the Refinery's tanks or received from onshore tankage.

Each of the berth's independent pipeline system is composed of a main and a circulation pipeline. These two types of pipelines are connected at each berth mooring location through a pipeline end manifold (PLEM). Circulating lines are used to flush the main line with a gas oil or light hydrocarbon mixture, as applicable, after each loading or unloading of a vessel. The gas oil or light hydrocarbon remains in the pipelines until the next loading or unloading occurs. A flexible hose is connected to the end of the PLEM for connecting the pipeline to the ship. Once the vessel is secured to the mooring buoys at the berth, the hose is lifted from the bottom of the bay, connected to the vessel, and pressure-tested prior to loading or unloading.

Berth 3, approximately 1.4 miles (2.3. km) offshore, is a seven-buoy mooring consisting of two separate piping systems. One system (3B) is for crude oils, refined products, and fuel oils; the other system (3C) is for light oils, primarily gasoline, diesel, and jet fuels. The 3B system was installed in 1962. An unlighted can buoy marks the end of the submarine hose, which consists of six 25-foot (7.6-m) lengths of 16-inch (40.6-centimeter [cm]) hose following a steel reducer and three 30-foot (9.1-m) lengths of 12-inch (30.5-cm) over-the-rail hose. The hose string is connected to a PLEM from which 26-inch (66-cm) and 12-inch (30.5-cm) pipelines extend to the onshore facilities. An eight-inch (20.3-cm) diameter, 50-foot (15.2-m) long crossover hose connects the 26-inch (66-cm) and 12-inch (30.5-cm) pipelines.

The 3C system was installed in 1970 and extended from Berth 2 in 1993. It has one unlighted spar buoy and an unlighted can buoy. The seaward can buoy marks the end of the 12-inch (30.5-cm) submarine hose, which consists of seven 35-foot (10.7-m) lengths.

Figure 2-4
Marine Terminal Offshore Facilities



Source: Chevron 2005

This hose string is connected to a PLEM from which a 16-inch (40.6-cm) and a 12-inch (30.5-cm) pipeline extend to the onshore facilities. Synthetic rope attached to a concrete block anchors the spar buoy to the sea floor.

The size of vessels visiting Berth 3 typically ranges from 14,500 to 123,000 dead weight (metric) tons (DWT). One 1,500-horsepower (hp) booster pump and one standby 500-hp booster pump, located near the center of the Marine Terminal's onshore facilities, are used in conjunction with on-board ship pumps to convey oils to and from Berth 3. A separate vacuum pump is designed to keep the system under slight vacuum when the pipeline is idle, during vessel maneuvering, and until the hose end is connected to the ship's manifolding immediately before loading begins. A 15-hp injection pump maintains pressure on the underwater hoses to avoid kinking as they are lifted off the ocean bottom, laid across the ship's rail, and connected to the ship's manifolding. The pump operates similarly when the hoses are disconnected and replaced on the ocean bottom.

Berth 4, approximately 1.5 miles (2.4 km) offshore and 950 feet (289.6 m) south of the submarine lines from Berth 3C, is a seven-buoy mooring used for the transfer of fuel oils, crude, and crude products. The berth is connected by 36-inch (91.4-cm) diameter and 14-inch (35.6-cm) diameter submarine transfer lines to onshore facilities. An inshore spar buoy marks the end of the submarine transfer lines and a can buoy indicates the hose end. The buoy arrangement is generally the same as Berth 3. The hose string for Berth 4 consists of four 20-inch (50.8-cm) diameter hoses 35 feet (10.7m) long, a 20-inch (50.8-cm) by 16-inch (40.6-cm) diameter tapered hose 40 feet (12.2 m) long, one 16-inch (40.6-cm) diameter hose 40 feet (12.2 m) long, and three 16-inch (40.6-cm) over-the-rail hoses 30 feet (9.1 m) long. This hose string is connected to a PLEM, where 36-inch (91.4-cm) and 14-inch (35.6-cm) pipelines extend to the onshore facilities. The spar buoy is anchored to the sea floor by synthetic rope attached to a concrete block.

The size of vessels visiting Berth 4 typically ranges from 35,000 to 211,000 DWT. Three 1,250-hp booster pumps located at the south side of the onshore facilities transfer Refinery products to and from Berth 4. A vacuum pump and pressure pump are also used in the same manner as the Berth 3 pumps. Table 2-1 shows characteristics of the pipelines connecting the onshore Marine Terminal with the berths.

Mooring Procedures

Based on weather and tide conditions, either one or two tugs are used for mooring and unmooring. The Chevron Mooring Master coordinates all maneuvering and navigation to and from the Marine Terminal with the Marine Exchange Vessel Traffic Information System. All mooring activities, including dropping the vessel's anchors and securing lines between the vessels and mooring buoys, are directed by the Mooring Master, who is onboard the vessel and works with the vessel's crew and operators of the line launches. Once the vessel is secured in the moorings, the Mooring Master coordinates cargo operations with the wharf operator.

Table 2-1
El Segundo Marine Terminal Pipelines Characteristics

Pipeline	3B Main	3B Circ.	3C Main[1]	3C Circ.	4 Main	4 Circ.
System	Crude	Crude	Light Oils	Light Oils	Crude	Crude
Year Installed	1962	1962	1970/1993	1970/1993	1972	1972
Pipe Size, inches (m)	26 (0.7)	12 (0.3)	16 (0.4)	12 (0.3)	36 (0.9)	14 (0.4)
Offshore Length, feet (m)	7565 (2306)	7565 (2306)	7710 (2350)	7710 (2350)	8181 (2494)	8314 (2534)
Wall Thickness, inches (m)	0.5 (0.013)	0.406 (0.01)	0.312 (0.008)	0.33 (0.008)	0.562 (0.014)	0.375 (0.01)
Pipe Grade[2]	API-5L-42	API-5L-B	API-5L-B	API-5L-B	API-5L-42	API-5L-42
Operating Pressure, psia (MPa)[3]	180 (1.2)	180 (1.2)	180 (1.2)	180 (1.2)	180 (1.2)	180 (1.2)
Rated Pressure, psia (mPa)	275 (1.9)	Not Available	275 (1.9)	Not Available	275 (1.9)	Not Available
Typical Throughput Rate, kbph[4]	15-20	Not Applicable	7-12	Not Applicable	35-45	Not Applicable
Maximum Throughput Rate, kbph	35	Not Applicable	35	Not Applicable	62	Not Applicable
Maximum Temperature, °F (°C)[5]	185 (85)	Not Applicable	185 (85)	Not Applicable	185 (85)	Not Applicable
Most Recent Smart-pig Survey Date	none	none	none	none	9/19/2005	none

Note: pipeline lengths based on a map dated 9-16-1991 submitted as part of Chevron application materials
[1] 1.0 miles (1.6 km) of the 3C pipelines were originally installed in 1970 to Berth 2 then extended 0.4 miles (0.6 km) to Berth 3 in 1993. Circ. refers to circulation lines.
[2] API = American Petroleum Institute
[3] psia = pounds per square inch absolute, MPa = megapascal
[4] kbph = thousand barrels per hour
[5] °F = degrees Fahrenheit, °C = degrees Celsius

Chevron requires vessels to successfully complete Chevron Shipping Company's vetting process before they can call at this terminal. Vessels scheduled to go directly into berth upon arrival are met by a mooring launch with a Chevron Mooring Master and an Environmental Cargo Officer (ECO) three miles (4.8 km) southwest of Buoy 2ES. The Mooring Master guides the vessel's Master while approaching and departing the berth, mooring, and unmooring. The ECO assists the Mooring Master and acts as the Terminal Representative and Pollution Prevention Officer on the vessel.

Figures 2-5 and 2-6 show the mooring layouts for Berths 3 and 4 respectively. Vessels follow general procedures, explained below, for berthing tank vessels in Berths 3 and 4. Detailed procedures are modified to fit conditions of the particular berth, wind, current, sea state, vessel size, and limitations; these procedures are the subject of a detailed passage plan discussed and confirmed by the vessel's Master before commencing the operation.

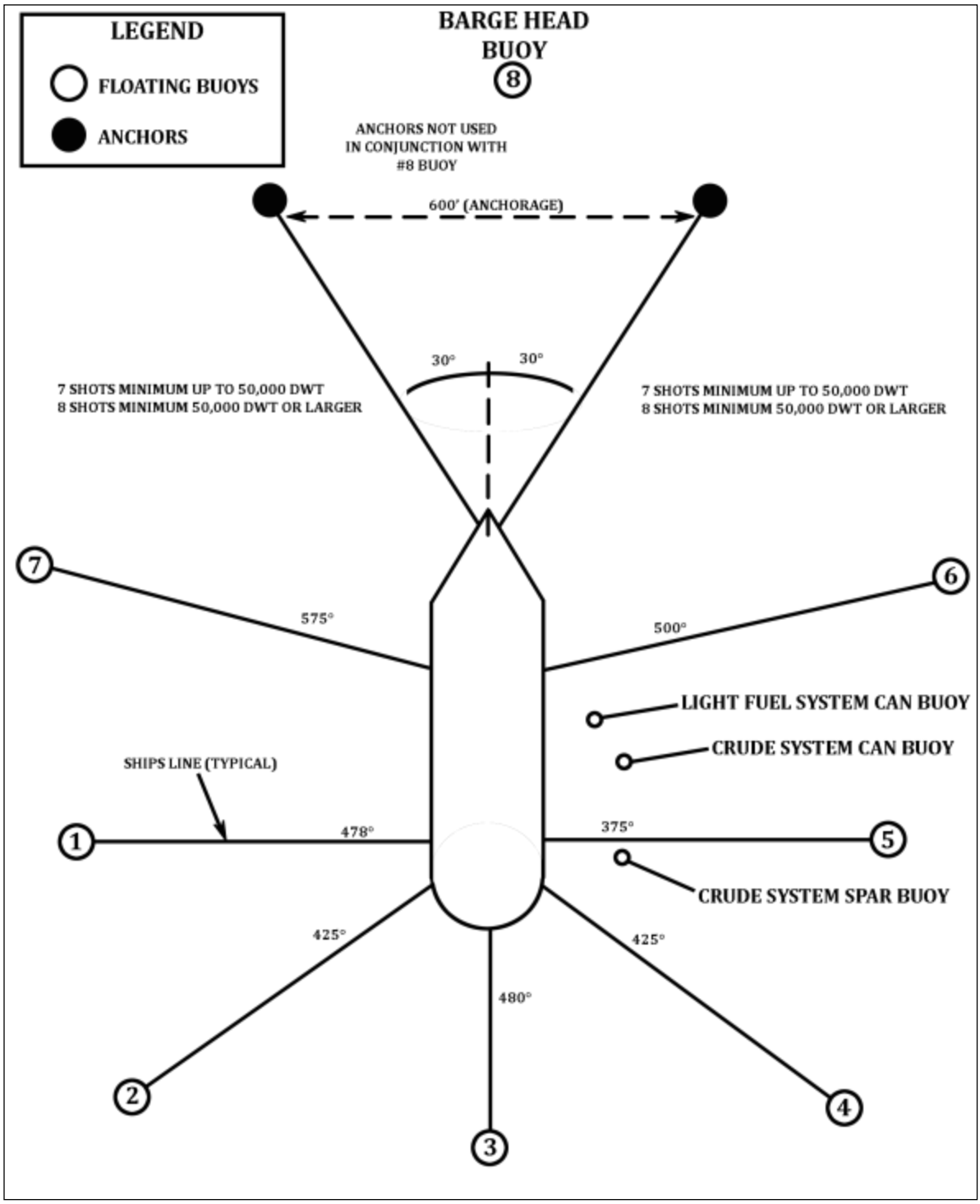
Pilotage and Navigation

United State Coast Guard (USCG) rules (46 Code of Federal Regulations [CFR] 15) require pilots with Federal licenses onboard all vessels that call at offshore marine oil terminals in California. The effect of this rule is that tankers arriving early at the Marine Terminal do not anchor several miles offshore and wait for the opening of a berth since they must have licensed pilots when they are within three miles (4.8 km) of the shore in Santa Monica Bay. Rather, tankers divert to the Federal mooring locations (see Figure 2-2) or the Port of Los Angeles (POLA) or Port of Long Beach (POLB) and anchor there to wait and handle cargo and stores. They only move to the Marine Terminal after the mooring is open and they may proceed directly to berth.

The CSLC requires that all vessels calling at the Marine Terminal have onboard a Mooring Master and an assistant Mooring Master, both federally licensed, at all times. The USCG regulates navigation equipment and procedures on all vessels within U.S. navigable waters and randomly checks for their compliance.

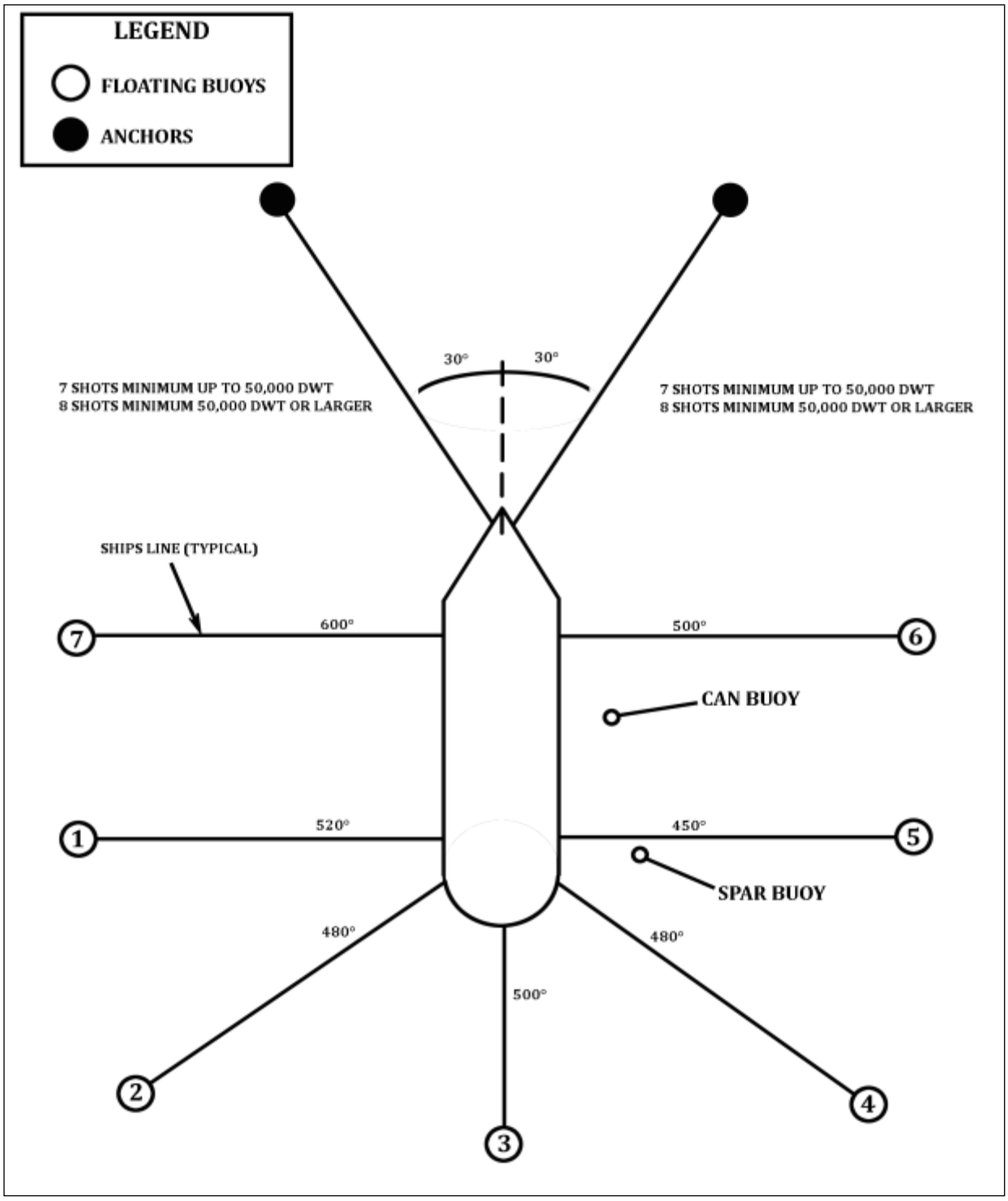
In October 2006, Chevron began the practice of requiring a tug boat to be present when any vessel is approaching, mooring at, or departing the Marine Terminal. The purpose of the tug is to assist vessels while they are in the vicinity of the terminal and to increase responsiveness in case of an accident. Chevron's onshore Marine Terminal facility operators maintain visual and audio communication with the tug and mooring vessels.

Figure 2-5
Mooring Layout for Berth 3



Note: Shots are the lengths of chain connected to make up the ship's anchor chains. A standard shot is 15 fathoms (90 feet [27.43 m]).
Source: Parsons 1995

Figure 2-6
Mooring Layout for Berth 4



Note: Shots are the lengths of chain connected to make up the ship's anchor chains. A standard shot is 15 fathoms (90 feet [27.43 m]).
Source: Parsons 1995

Chevron requires all Mooring Masters to have successfully completed the Chevron Mooring Master Training Program and possess an Unlimited U.S. Master Mariners License with a Federal First Class Pilotage Endorsement for El Segundo Offshore Moorings. Recognizing the importance of ongoing training, Chevron entered into an alliance with the Southampton Maritime Institute in Southampton, England, in 1984. At their facilities, Chevron Mooring Masters are given specialized simulator and "manned model" training. During these training opportunities, Chevron Mooring Masters are trained in advanced ship handling procedures, including emergency maneuvers and Bridge Team Management.

Both USCG and CSLC regulations require advance notification (24 hours) of the arrival of all tank vessels. However, Chevron requires all vessels to provide their estimated time of arrival at the Marine Terminal seven days, three days, and 24 hours in advance. Within two hours of the estimated time of arrival, communications are established with Chevron's Mooring Master or the Marine Terminal via very high frequency radio.

Tankers en route to the Marine Terminal use the global positioning system (GPS) for navigation when far offshore. As vessels approach the coast and/or offshore islands, radar positioning is included. Finally, near the Marine Terminal, the navigational buoy marking the moorings is used. Once aboard a tank vessel, Chevron's Mooring Master uses a portable-differential GPS receiver to determine the vessel position. Vessel positions are monitored by Chevron's Marine Control facility at the adjacent Refinery. This facility uses portable radar and communication equipment to monitor Chevron's vessel traffic throughout the region, with vessel positions displayed on a monitoring screen in a control room at the Refinery. The control room is manned by Chevron operations staff associated with the marine terminal who assist in vessel navigation near the terminal. All tankers are required to be equipped with an Automatic Radar Plotting Aid that quickly and automatically plots radar targets and is used for collision-avoidance in open waters. Some of these vessels are also equipped with an Electronic Chart Display and Information System that receives position data from the above radio-navigational instruments and integrates the data with a voyage plan and a hydrographic database to provide a real-time display of their position.

Navigational buoy 2ES, operated by Chevron, is required by the USCG to warn all mariners of the presence of the Marine Terminal moorings. The steel buoy is equipped with a radar beacon, flashing light, daymark, bell, and a current meter and measures eight feet (2.44 m) in diameter by 26 feet (7.92 m) in length.

A vessel, escorted by a tug assist, approaches the mooring on a due-north heading, passing approximately 600 feet (182.9 m) west of the Number 7 mooring buoy. The ECO and mooring launch crew assist the Mooring Master with dropping and positioning the vessel's anchors. The port and starboard anchors are dropped and positioned in approximately 80 feet (24.4 m) of water in Berth 4 and 73 feet (22.3 m) of water in Berth 3. The vessel is then backed into position and the mooring launch is used to tie up the vessel to seven large mooring buoys; the order in which the vessel is tied to each buoy is determined by wind and other current conditions.

A vessel typically leaves the berth in reverse procedure. The vessel's crew slacks the lines and the mooring launch crew releases the lines at the buoy; anchors are heaved in accordance with wind and other current conditions. A tug assist is available at all times during the mooring, cargo loading and unloading, and unmooring operations.

The maximum operating draft for vessels is 41 feet (12.5 m) in Berth 3 and 56 feet (17.1 m) in Berth 4. Additionally, vessels calling at the Marine Terminal are required to have a net under-keel clearance of at least six feet (1.8 m) from the sea floor and any known obstructions at all times during the mooring, unmooring, and oil transfer operations.

Cargo Transfer Operations

Personnel

Personnel on duty and their responsibilities during cargo transfer operations are outlined in the El Segundo Marine Terminal Manual (Chevron 2008a). The Mooring Master is a Senior Chevron Shipping Company Supervisor and is on board the vessel throughout the mooring, cargo transfer, and unmooring operations. The ECO reports to the Mooring Master and acts as the Pollution Prevention Officer while on board the vessel. The ECO inspects the vessel for proper mooring equipment, observes mooring and unmooring operations, and coordinates cargo handling operations while acting as a liaison to the onshore Marine Terminal facilities. The Mooring Master and ECO are authorized to suspend cargo transfer at any time they deem necessary. A minimum of two Chevron personnel are located onshore at the Marine Terminal during transfer procedures. The Head Operator is stationed in the onshore facility control room and is responsible for shore facilities, flow rates, critical points, record keeping, and communications between shore, ship, Mooring Master, and outside agencies. The O-5 Operator is a roving operator responsible for setting lines and manifold, gauging tanks in preparation for cargo tanker transfers, and assisting the Head Operator.

The duties of the vessel Master include responsibility for the vessel at all times. The Mooring Master advises the vessel's Master with respect to connecting, valve operation, loading and discharge pressures and temperatures, and product transfer hazards, but does not direct transfer operations except as necessary to protect the Marine Terminal facilities. Manipulation of the ship's valves and the hose valve is the direct responsibility of the ship's personnel. Each ship has a designated Vessel Person in Charge (VPIC) of cargo transfer, who has at least two assistants at all times, one to maintain watch at the manifold area and another to assist wherever required. Chevron requires a posted watch or shift schedule and sufficient crew on board at all times to assist with disconnecting hoses, unmooring, and departing the berth.

To facilitate communication, Chevron requires the VPIC to speak fluent English, to remain in the vicinity of the transfer operation, and to be available to the Mooring Team to supervise connections, disconnections, topping off, and emergency shutdowns, if required. The Mooring Team provides portable radios for use during cargo operations, and comparison gauges are made every two hours, or more frequently if required. Signals for standby, slowdown, and shutdown of transfer operations are conducted by terminal-supplied ultra-high frequency radio, and back-up communication is provided by telephone and access to very-high frequency radios.

Cargo Transfer

Before cargo transfer operations start, the Mooring Master and the vessel's cargo officer complete the Marine Terminal Declaration of Inspection (DOI). This checklist verifies that precautions taken to prevent pollution and assure safety in operations are understood and agreed upon by the Ship's Captain, Chief Engineer, and the Mooring Master.

Safety precautions taken to prevent spills when connecting and disconnecting transfer lines are specified in the Marine Terminal Manual (Chevron 2008a). According to the Manual, after the vessel has securely moored in the berth, the ECO or Mooring Master supervises lifting and connecting the cargo hose following these general procedures:

- The line crew secures the vessel's runner to the hose buoy.
- The cargo boom lifts the submarine hose to its correct height.
- The ship's crew hangs off the submarine hose at the rail with the chain attached to the hose. The end of the hose is then lowered to the deck in a smooth curve.

- The ship's crew unbolts and removes the blind flange from the end of the hose string. The hose is lifted to the vessel's riser after the flange is removed. All berths require 12 to 18 feet (3.7 to 5.5 m) minimum distance between the manifold and the ship's rail and the top of the roll bar must not be higher than the bottom of the manifold.
- All hoses are supported with double slings, bridle, or saddle. Single slings are not permitted.

Next, either pressure or vacuum is applied to the subsystem as required during maneuvering and cargo hose handling operations. The manifold connection is pressure tested for leaks once connected. After the connection, the Mooring Master or ECO conducts a Pre-Transfer Conference with the Chief Mate. Two copies of the Marine Terminal's DOI are completed and throughout the vessel's port stay the VPIC, the Mooring Master, and ECO must sign both copies of the DOI to acknowledge assumption of the watch.

Cargo is discharged from the vessels to the Marine Terminal onshore facility using the ship's pumps. Booster pumps at the onshore pumping station then help pump the product uphill to the tank farm once flow has been established. All shipboard cargo transfer action is taken by the ship's crew on the advice of the Mooring Master or the ECO. The sequence of operations for each transfer is controlled by facility personnel in the pumping station control room onshore. Vessels must have a containment system on the ship deck under or around each pipeline manifold connection as well as around their vessel fuel tank vents and overflow fill pipes, as per 33 CFR Section 155.

When loading vessels, the Terminal Head Operator will notify the vessel of the number of gross barrels of product that will be loaded, including line displacement and hose flushes. The vessel shall sufficiently notify the Terminal Head Operator prior to the final quantity being reached. The Terminal Head Operator in the shore control room will stop pumps and close valves as appropriate to stop loading.

Vapors displaced during cargo loading operations are captured by onboard vapor recovery equipment or by auxiliary barges fitted with vapor recovery equipment to comply with Article 5 of the California Code of Regulations, which requires marine terminals to use vapor control systems. (See Section 4.1, System Safety and Reliability, and Section 4.4, Air Quality, for further information on regulatory requirements and Chevron's use of vapor control systems.)

Hose disconnection procedures are essentially the reverse of the connection procedures, with the additional step of line flushing. When cargo loading or discharge operations are complete, the vessel's hose valves are closed and appropriate stock is pumped from shore, as applicable, into the displacement line to flush the main line for approximately 15 minutes. The shore valve on the main line is then shut and 150 barrels (bbl) of cutter fluid are pumped throughout the displacement line to flush the hose content back to the ship. A vacuum is applied to the hoses during disconnection and the lines are pressure tested.

2.3.2 Volumes, Types of Materials Handled, and Vessel Calls

Vessel calls at the Marine Terminal involve importing crude oil and exporting refined products. In 2006, vessels called at the Marine Terminal 347 times. Three types of vessels call at the Marine Terminal:

- Large tankers (greater than 80,000 DWT), with a capacity of 500,000 to 1 million barrels;
- Small tankers (20,000 to 80,000 DWT), with a capacity of 50,000 to 500,000 barrels; and
- Barges (14,500 to 20,000 DWT), with a capacity of 50,000 to 150,000 barrels.

The large tankers bring in crude oil through the Marine Terminal, while the small tankers and barges may be used to import or export crude oil, components, and petroleum products. A summary of vessel characteristics calling at the Marine Terminal between 2006 and 2008 is shown in Table 2-2.

In most cases, the Marine Terminal can transfer oil to and from two vessels simultaneously when one vessel is in each berth. The average amount of crude oil passing through the Marine Terminal in 2006 was approximately 224,000 bpd, which represents about 80 percent of the amount of crude oil received at the Refinery. The remainder of the Refinery's crude oil requirements is pumped through onshore pipelines, truck and rail from oil fields in the Los Angeles Basin, Ventura, and the San Joaquin Valley.

The Marine Terminal receives both crude oil and non-crude materials. Non-crude materials include various Refinery feeds, such as gas oil and alkylate. In addition, the Refinery transports products including high sulfur fuel oil and diesel fuels. In 2006, the material moving through the Marine Terminal by volume was 84 percent crude oil, 11 percent non-crude, and five percent products. The source of the crude oil entering the

Marine Terminal in 2006 was 60 percent from the Middle East, 34 percent from South and Central America, two percent from Alaska, and four percent from Africa and Asia.

The time required to moor and offload a single crude oil tanker ranges from a few hours for barges to more than 24 hours for larger vessels. The Marine Terminal capacity is reported by Chevron to be 700,000 bpd. Currently the Refinery capacity is approximately 270,000 bpd.

Table 2-2
Vessel Calls at the El Segundo Marine Terminal
2006-2008

Year	Type of Vessel	Number	Discharge Volume (bbl)	Double-Hulled Percent	Type of Cargo
2006	Large Tankers	156	72,384,851	100%	HC, 18% LC, 80% Product, 1%
	Small Tankers	120	20,603,715	100%	HC, 3% LC, 49% Product, 48%
	Barges	71	5,056,530	96%	Product, 100%
2007	Large Tankers	162	71,936,043	100%	HC, 20% LC, 74% Product, 6%
	Small Tankers	104	15,007,052	100%	HC, 6% LC, 17% Product, 77%
	Barges	57	4,085,455	100%	Product, 100%
2008	Large Tankers	198	82,378,282	100%	HC, 26% LC, 73% Product, 2%
	Small Tankers	80	14,488,146	100%	HC, 13% LC, 26% Product, 61%
	Barges	36	2,263,813	100%	Product, 100%

Source: Chevron 2008c

In 2006, each berth was occupied an average of 49 percent of the time, including time to maneuver to the berths (one hour to arrive and one hour to depart the berth). The time that any berth was occupied (i.e., any vessel was present at either or both berths)

was 67.4 percent of the time. The average time at berth in 2006 was 21.3 hours, including one hour each for arrival and departure.

Diversions to Other Terminals

When the Marine Terminal berths are occupied, vessels scheduled for Berths 3 and 4 are diverted to federal anchorages ES-1 and ES-2 until the appropriate berth is available as authorized by the U.S. Coast Guard (USCG) (Captain of the Port of Los Angeles 1997). These federal anchorages have a radius of 0.3 miles (0.5 km) from their midpoints. ES-1 and ES-2 are located approximately three miles (4.8 km) offshore in federal waters. Figure 2-2 shows the location of these anchorages in relation to Berths 3 and 4. Having an established location for vessels to moor while awaiting use of the Marine Terminal reduces the risk of marine collisions and groundings, reduces confusion as to whether anchoring is permissible, and has established specific locations suitable for anchoring. Table 2-3 shows data regarding vessel calls at the anchorages from 2004 through 2006. There were, on average, 58 vessel calls per year to the federal anchorages. The average visit was 36.4 hours.

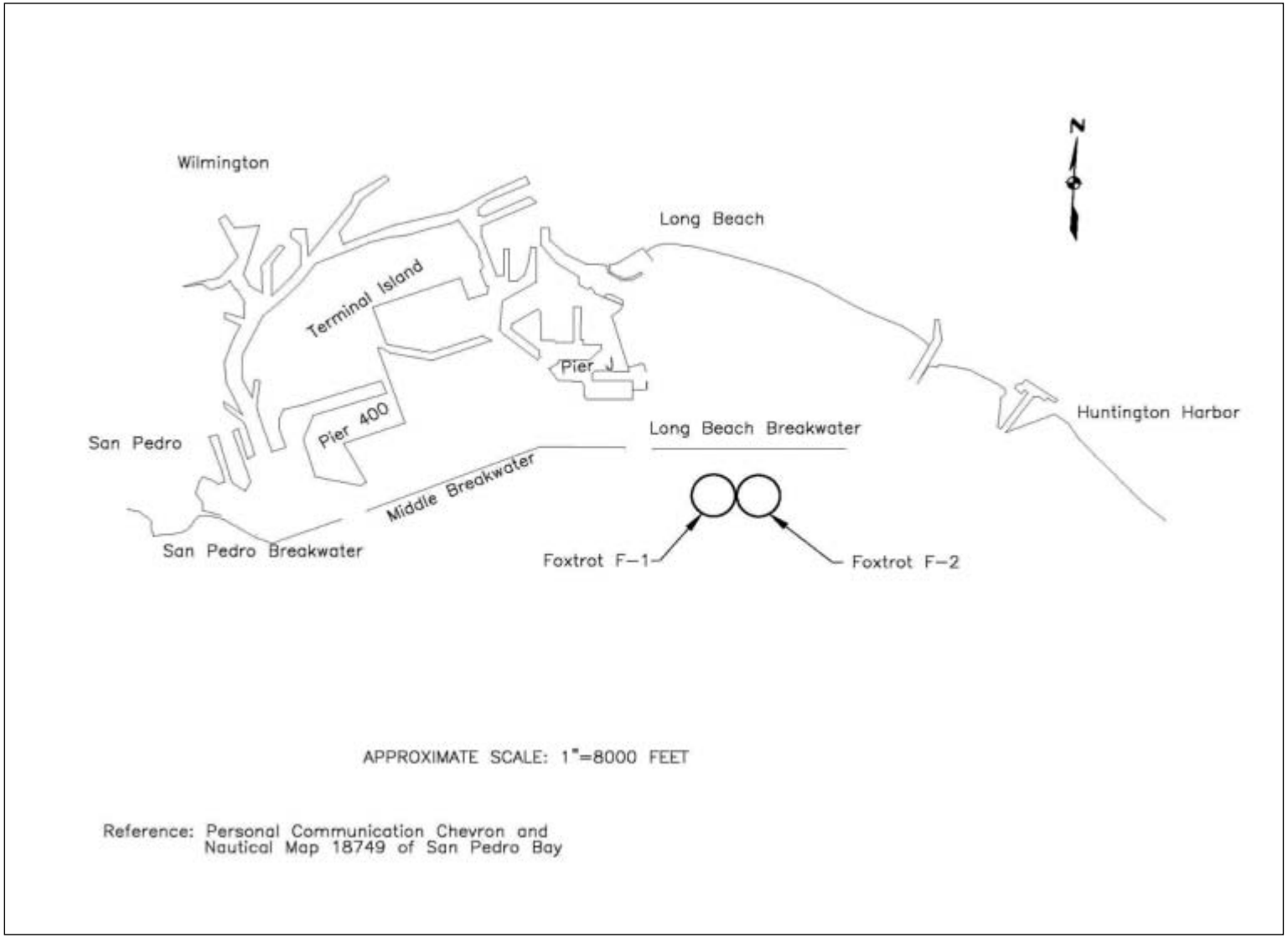
Table 2-3
Use of Federal Anchorages

Year	Total Number of Vessels	Total Hours per Year	Average Hours per Vessel
2004	60	2003	33.4
2005	65	2430	37.4
2006	47	2212	47.0
2007	69	2358	34.2
2008	48	1440	30.0

Source: Chevron 2007

Anchorage areas ES-1 and ES-2 were established by the USCG Captain of the POLA/POLB (Public Notice No. 1-97) and are clearly marked on National Ocean Service chart 18748 (El Segundo and Approaches). If the berth is occupied on arrival and it is necessary to anchor while awaiting berth, an anchorage will be assigned by the vessel traffic service. Vessels seeking a long-term anchorage (more than 48 hours) are asked to utilize POLA/POLB Foxtrot outside anchorage (see Figure 2-7). Vessels started using the Foxtrot anchorages in 2007 and vessels anchored there, on average, three times a month during the first three months of 2007.

Figure 2-7
Location of Foxtrot Anchorages at the Port of Long Beach



Approaches and Departures

The Refinery exports diesel fuel, gas oil, number six fuel oils, commercial jet fuel, fluid catalytic cracker, light cycle oil, crude oil residuum, motor gasoline, and motor gasoline components through the Marine Terminal. The Refinery products sent through the Marine Terminal are delivered by vessel to the Los Angeles and Long Beach Harbors, northern California, Oregon, Washington, Mexico, Hawaii, and Asia.

All Chevron-owned and controlled vessels are to observe a maximum 12-knot speed limit, weather and safe navigation permitting, in a zone extending 40 nautical miles (74.1 km) seaward from Point Fermin in Long Beach, California, for all transits regardless of the destination. The passage plan should include this demarcation line and the vessel should log the time when entering this zone and its operational speed.

Vessels carrying crude oil, black oil, or persistent oil in bulk and conducting lightering operations in the Gulf of Catalina are required to use the Outer Santa Barbara Passage when proceeding directly to El Segundo Marine Terminal for discharge. Vessels are required to transit south and west of Santa Catalina Island with a minimum distance from the island of five nautical miles (9.3 km) to avoid frequent and extensive operations conducted in the area by the Navy.

Barges with tugs move to and from the POLA and POLB along the coast inside the northbound shipping lanes.

VLCC Lightering

More than 50 percent of the crude oil received at the Marine Terminal is from the Middle East, which is generally transported in very large crude carriers (VLCC) or ultra large crude carriers (ULCC). The VLCC are capable of carrying approximately two million barrels of oil and ULCC carry approximately three million barrels. The VLCC and ULCC are too large to moor at the Marine Terminal since their draft is typically greater than the seafloor depths at the Marine Terminal. Therefore, the VLCC and ULCC remain offshore and offload batches of crude oil into smaller tankers (each capable of carrying between 500,000 and one million barrels), which are able to moor and offload at the Marine Terminal. This process of offloading crude oil to smaller vessels is called “lightering.”

Chevron conducts lightering operations to supply crude oil to the Chevron California refineries. Approximately 60 percent of the crude from the lightering area goes to the

Richmond Refinery in the San Francisco Bay area and approximately 40 percent of the crude goes to the El Segundo Refinery.

Chevron Southern California lightering operations are conducted in an area known as Echo-PAL. The Echo-PAL location is USCG-approved and is a minimum of 20 miles (32.2 km) offshore to a maximum of approximately 30 miles (48.3 km) offshore of the San Diego County coastline. This area is outside of the South Coast Air Quality Management District (SCAQMD) jurisdiction and is within the U.S. Exclusive Economic Zone. The Echo-PAL lightering area is shown in Figure 2-1. The Echo-PAL area is not exclusive for Chevron use; it also serves other terminals in the area. From lightering vessels, not all the oil is discharged at the Marine Terminal. Sometimes, only part of the cargo from the VLCC and ULCC is offloaded and delivered to the Marine Terminal and some of the cargo may be offloaded and delivered to POLA/POLB terminals operated by other companies.

The number of VLCC and ULCC tankers lightering at the Echo-PAL location in 2006, 2007, and 2008 was 41, 45, and 53 vessels, respectively, generating 94, 68, and 98 lightering vessel calls to the Marine Terminal, for an average rate of 1.87 Marine Terminal calls per VLCC.

2.3.3 Onshore Facilities

The Marine Terminal onshore facilities consist of pipelines and equipment used to discharge feedstocks into the Refinery's tanks or to load products from the Refinery tanks onto vessels. There are three systems onshore: Berth system 3C is used to load or discharge light products or components; Berth system 3B is used to load or unload various types of gas oils, fuels oils, and crude oils; and Berth system 4 is used to load and unload various types of crude oils, gas oils, or fuel oils.

Each of these onshore systems consists of:

- Transfer, displacement, and injection pipelines;
- Pumps;
- Continuous vacuum systems;
- Sampling systems; and
- Control systems.

Onshore Marine Terminal facilities include a control house, three berth pump stations, two substations, and connecting pipelines and valves on a nine-acre (3.6-hectare) parcel of Chevron-owned land approximately 200 feet (70.0 m) wide on the shoreline side of Vista del Mar. Figure 2-8 illustrates the relative locations of these facilities. A minimum of three employees are on duty at the Marine Terminal 24 hours per day during loading and unloading operations.

An eight- by eight-foot (2.4- by 2.4-m) wooden shed (Building No. 554), next to the Refinery forebay, is a temporary structure that protects laboratory personnel from the elements while pulling forebay samples. The control house (Building No. 544) is a permanent structure, 40 by 27 feet (12.2 by 8.2 m), of cinderblock and a plywood roof deck on a steel frame. The control house contains operating control panels, desk space for two operators, a small kitchen area, and a lavatory.

During the El Niño storm events in 1982 and 1983, severe erosion along the beach area immediately in front of the Marine Terminal onshore area exposed pipelines that connect the onshore areas and the moorings. In 1983, in response to the erosion and to ensure the pipelines remained covered by sand, Chevron constructed a protective peninsula of rocks, called a groin, near the southern boundary of the Marine Terminal site and brought in approximately 620,000 cubic feet (17,500 cubic meters) of sand fill north of the new groin area to protect the shoreline and sea floor sediment from severe erosion caused by ocean storms (Fontaine 2008). Originally, the groin was 900 feet (274.3 m) long with an elevation of +12 mean lower low water (MLLW). The first 450 feet (137.2 m) of the groin were constructed of concrete and the remainder in rock. At approximately -1 foot MLLW, 450 feet offshore (137.2 m), the groin becomes semi permeable to allow sand flow through the groin. To construct this part of the groin, 13-ton (11,793.4-kilogram [kg]) rocks were sloped at a 1:1.5 angle. During 1985 and 1986, winter storms destroyed approximately 160 feet (48.8 m) of the seaward extent of the groin. In 1987, the groin was repaired using 20- to 25-ton (18,000- to 22,500-kg) rocks at a slope of 1:3; it now extends 800 feet (243.8 m) offshore.

Figure 2-8
Marine Terminal Onshore Facilities

2.4 OIL SPILL RESPONSE CAPABILITY

Chevron's Oil Spill Contingency Response Plan outlines procedures to activate and implement a response to an oil spill at the Marine Terminal (Chevron 2008b). In summary, the following response assistance is available immediately if a release occurs during a transfer operation:

- Boom is on hand at all times (a minimum of 1,000 feet [304.8 m]) during the transfer operation and can be deployed immediately from the line launch boat at the mooring.
- Personnel have been trained in spill response and can begin emergency procedures immediately.
- Three response boats are located in King Harbor, approximately five miles (8.0 km) from the Marine Terminal, and can be deployed and onsite within two hours.

Chevron's oil spill response resources include a command center, 60 to 80 trained personnel, onsite response equipment, company resource teams, and access to outside support organizations. These resources are described in the following sections.

2.4.1 Command Center

The primary command center is located within the Refinery, east of the Marine Terminal at the Chevron café annex. The command center has space available to accommodate desks, network computers, fax machines, telephones, and radios, as well as additional agency personnel to facilitate agency liaison and coordination. Five four-wheel drive vehicles are also available within the Refinery for immediate use at the command center.

2.4.2 Spill Response Personnel

Chevron has 60 to 80 employees in its El Segundo Oil Spill Response Team; 25 employees are trained and capable of responding offshore, while 50 are trained to function in the incident command system onshore. Chevron response personnel are prepared to respond to a spill 24 hours per day.

Additionally, as described in the Marine Terminal Oil Spill Contingency Response Plan, Chevron corporate resource teams are available to assist in emergency response (Chevron 2008b).

These teams include:

- The Advisory and Resource Team. This team provides expert advice during initial stages of an incident. It includes experts in emergency response, ecology, law, public affairs, safety and health, and marine transportation, who are prepared to arrive at their local airport within two hours notice and at the Marine Terminal in approximately 3.5 hours.
- The Functional Team. This team provides specialized services in the areas of communications, comptroller, environmental, facilities, human resources, insurance claims, law, medicine, public affairs, purchasing, safety, fire, health, security, and transportation. They are prepared to arrive at their local airport within six hours of notice and at the Marine Terminal in approximately 7.5 hours.

These teams would execute the Oil Spill Contingency Response Plan as soon as they are contacted by the Incident Commander. After arriving at the scene, the Advisory and Resource Team would immediately report to the Incident Commander to explain its function and capabilities and offer its services. This team would then assist in marshaling a wide variety of necessary internal and external resources. Functional Team members may be assigned to a number of duties including: set up and operation of an integrated communications network; accounting, cost control, and office support; environmental impact assessment, permitting, modeling, monitoring, wildlife rescue and rehabilitation, response and remediation, and waste management; provision of office warehouse, housing, water, food, and sanitation facilities; staffing and human resources services; insurance, injury, and property damage claims resolution; advice on legal and liability matters; medical support; media relations, press releases, and interface with governmental agencies, community leaders, and the public; procurement and storage of equipment; technical advice and support on safety, hygiene, fire protection, and toxicology; guard services, site access control, theft prevention, and personal security; and transportation for personnel, equipment, and supplies.

2.4.3 Spill Response Equipment

Oil spill response equipment available immediately upon the occurrence of an oil spill at the Marine Terminal includes 5,750 feet of boom (see Section 4.1, System Safety and Reliability) , skimmers/pumps, sorbent pads, hand tools, vehicles, boats, generators, lighting, cable, and communication equipment. The majority of this dedicated, oil-spill-response equipment is stored at Chevron's Oil Spill Warehouse.

Fast response boats are available to Chevron immediately upon the occurrence of an oil spill at the Marine Terminal. This equipment is available 24 hours per day, 365 days per year. The response times referenced include time to call and assemble crews, traveling, accessing the spill site, and preparation to respond to the spill.

The *Lucy Foss* oil spill response vessel, operated by Foss Maritime, is located at King Harbor in Redondo Beach, five miles (8.0 km) from the Marine Terminal. The vessels are equipped with Expandi pollution boom

Chevron also maintains its own response vessels in King Harbor:

- The *Boomer* is a 55-foot (16.8-m) fast response vessel that carries 1,000 feet (304.8 m) of ocean boom (43-inch [102.9-cm] Kepner ReelPak). Time to access and respond to a spill for this vessel is 30 minutes to one hour.
- The *Vanguard* is a 36-foot (11.0-m) fast response vessel. Time to access and respond is 30 minutes to one hour.
- The *Utility 1* is a 32-foot (9.8-m) fast response vessel. Time to access and respond is 30 minutes to one hour.

2.4.4 Spill Response Organizations and Contractors

Spill response support for the Marine Terminal is provided by the Marine Spill Response Corporation (MSRC). MSRC is the largest U.S. oil spill response organization for coastal and offshore oil spills. The *California Responder,* based in Los Angeles Harbor, has a response time of two to three hours and a recovery rate of 10,567 bpd. The MSRC in the Los Angeles and Long Beach area has a derated maximum recovery capacity of 93,928 bbl in a delivery time of 60 hours (Chevron 2008b).

2.4.5 Fire Detection And Response Capability

The Marine Terminal facilities are equipped with fire detection and response equipment, including fire isolation valves and fusible link valves, fire hydrants, fixed monitors, hose reels and hose stations, steam lances, fire deluge sprays, and fire extinguishers. In addition, Chevron's adjacent El Segundo Refinery maintains its own onsite fire and rescue department, which is available to serve the Marine Terminal during emergencies 24 hours per day.

Marine Terminal Fire Control Plan

The Marine Terminal maintains a Fire Control Plan that outlines procedures for employee training and control tactics for fire emergencies. On-duty personnel at the

Marine Terminal contact the Chevron El Segundo Fire Department either by radio or telephone to report any fires. The Fire Control Plan includes procedures to follow for various fire emergency scenarios and specifies the foam or water requirements to control fires. The Fire Control Plan is updated annually and reviewed by the city of El Segundo Fire Department.

The Chevron El Segundo Fire Department adheres to National Fire Protection Association standards and is recognized as a professional functioning fire department by the California State Fire Marshall's office. The Department is staffed with trained and certified fire fighters and emergency medical technicians. The Chevron El Segundo Fire Department holds regular training sessions and drills in conjunction with the city of El Segundo Fire Department. The Refinery also is active in the Beach Cities Community Awareness and Emergency Response organization, where industry and local government agencies coordinate emergency response activities, and is a sponsor of the Community Alert Network telephone call-out system. Chevron personnel notify the city of El Segundo when an incident occurs that may affect the public or when they are not able to handle the emergency without assistance.

Marine Terminal Fire Response Equipment

The Marine Terminal maintains equipment used in case of a fire: fire isolation valves, fusible link valves, 60-second valves, fire hydrants, fixed monitors, hose reels, hose stations, steam lances, fire deluge sprays, and fire extinguishers. Fire isolation valves isolate shipping facilities at the Marine Terminal from Refinery operations. Fusible link valves are equipped with a low-temperature link holding a butterfly-type valve open that will melt in a fire and cause the valve to snap shut.

Each berth is equipped with a set of 60-second valves onshore that operators can close in the event of a leak or fire to prevent additional product from reaching the submarine system. While most valves at the Marine Terminal close in 3.5 to 4.5 minutes, the 60-second valves close in 60 seconds.

Fire Boats

Fire boats are available from the POLA and POLB to assist with fire suppression. These fire boats would only be called upon in the event that an instantaneous response using fire extinguishing systems located on board the moored vessel and accompanying tugs at the berths could not control the fire.

2.5 PROPOSED PROJECT AND POTENTIAL FUTURE OPERATIONS

The proposed Project involves entering into a new 30-year lease, beginning in 2010 and ending in 2040, of tide and submerged state lands from the CSLC for continued operations at the Marine Terminal. The proposed Project would continue operations and implement future maintenance activities as needed.

2.5.1 Future Operations

Future operations at the Marine Terminal may change over time based on the normal variability of Refinery operations in a given year, although equipment configurations are expected to remain the same. The Applicant indicates in its Application that "*Based on recent trends, it is estimated that [Marine Terminal] throughput may increase from present levels by 1 percent per year during the next 5 to 10 years. Beyond the 10 year period, predicting throughput becomes more speculative. It is possible that a 1 percent per year increase in throughput could continue over the proposed 30-year lease period, although actual values may vary from year to year*."

Therefore, based on the Application, this analysis has assumed a one percent annual increase in Marine Terminal throughput over the lease term. This correlates to an increase in vessel calls at the Marine Terminal until 2040, assuming the approximate same vessel mix. Vessel calls could increase as much as 40 percent more than 2006 baseline operations (347 vessels calls) to 487 vessel calls per year by the end of the lease term in 2040. Sixty-three VLCC vessels would visit the Echo-Pal area, and an estimated 132 lightering vessels would call at the Marine Terminal (included in the 487 annual vessels calls).

A large number of variables could affect the Refinery operations and the resulting level of Marine Terminal vessel calls, including market forces such as crude oil prices, California demand for gasoline and diesel fuels, increased fuel efficiency regulations, other Refinery operations within California, and California crude oil production levels. These factors could increase or decrease Marine Terminal use. However, the estimated 2040 Marine Terminal vessel visits are considered a worst-case maximum of operations over the lease term.

2.5.2 Future Maintenance Activities

Routine repair and maintenance activities may be necessary during the lease period, including rearrangements of the seafloor pipelines and replacement of pipelines, pipeline end manifolds, and associated hoses. Minor improvements to the moorings

and minor maintenance improvements to onshore facilities, equipment testing activities, and spill and safety drills would occur throughout the lease term as needed. Future repair and maintenance activities and construction associated with Marine Terminal operations over the term of the 30-year lease period would be limited to existing and projected operations as detailed in this EIR. Any construction or pipeline replacement that would increase capacity at the facility would require additional environmental analysis and mitigation. Repair and maintenance activities are considered those that do not result in addition to, or enlargement or expansion of, the object of such repair or maintenance activities.

If the pipeline needed replacing during the new 30-year lease term, it would require more effort than routine repair and maintenance activities. It is assumed that pipeline replacement would occur for only one berth at a time. Construction and placement of pipelines would be expected to take approximately one to two months, with three construction phases: (1) pipeline construction and assembly at the POLA or the POLB; (2) pipeline transportation to the Marine Terminal; and (3) offshore installation.

The first phase would require assembly of the pipeline string at a location at the POLA or POLB. At this site, the pipeline segments would be assembled, inspected, and launched for towing to the offshore construction site. Construction equipment required during this phase would include two welders operating six hours per day, one dozer operating four hours per day, two sidebooms operating five hours per day, and two mobile cranes operating five hours per day. Three transport trucks would transport equipment and supplies to and from the site daily. The trucks would travel approximately 50 miles (80.5 km) per day and it is estimated that 15 construction workers would travel approximately 50 miles (80.5 km) per day for each construction phase.

Following Phase 1 activities, the pipelines would be launched in Phase 2. Launching the pipelines would be accomplished by three operating tugs, two for towing the pipeline and one assisting. A speed boat, or similar vessel, would accompany the tow tug to ensure that pleasure craft do not interfere with the towing.

Phase 3 would consist of the offshore installation, which requires the use of a derrick barge towed by one tug. Construction equipment, including a welding machine and a crane, would operate for eight hours per day.